Amendments to the Claims

The following listing of the claims replaces all previous listings and versions of the claims in the application.

Listing of the Claims

1. (Original) A device for selectively regulating the flow rate of a fluid, comprising:

a housing including an inlet and an outlet;

a plurality of flow conduits fluidly connected between the inlet and the outlet, the flow conduits being of substantially equal inside diameters, each of the flow conduits having a length representative of a different pre-defined flow rate; and

a flow rate selection mechanism, operatively mounted in the housing, for selectively obstructing fluid flow through the flow conduits, thereby to provide a flow rate from the inlet to the outlet corresponding to the combined flow rates of the unobstructed flow conduits.

2. (Original) The device of Claim 1, wherein the flow rate selection mechanism comprises:

a flow-blocking element operatively associated with each of the flow conduits, each flow-blocking element being selectively operable to block fluid flow through its associated conduit; and

an actuation mechanism operatively engageable with each of the flow-blocking elements and movable among a plurality of pre-defined positions in all but one of which it operatively engages one or more of the flow-blocking elements to block flow through the flow conduit associated with each of the operatively-engaged flow-blocking elements, and in one position of which it operatively engages none of the flow-blocking elements.

3. (Original) The device of Claim 2, wherein each of the flow conduits includes a resiliently compressible occlusion tube, and wherein each of the flow-blocking elements comprises a resilient element that is movable into and out of a flow-blocking compression against its associated occlusion tube.

4. (Original) The device of Claim 3, wherein the actuation mechanism comprises a plurality of cam elements, each of which is positioned operatively to move one of the resilient elements into a flow-blocking compression against its associated occlusion tube.

5. (Original) The device of Claim 4, wherein each of the resilient elements comprises a resilient cam follower finger located so as to be operatively urged into a compressive engagement with one of the occlusion tubes when the cam follower finger is engaged by a cam element.

6. (Original) The device of Claim 5, further comprising:

a cam rotor rotatably mounted in the housing and having the cam elements disposed thereon in positions in which each of the cam elements may operatively engage an associated cam follower finger as the cam rotor is rotated.

7. (Original) The device of Claim 6, wherein the cam rotor is rotatable among a plurality of rotary positions, each of which is associated with a predefined fluid flow rate.

8. (Currently Amended) The device of Claim [[5]] 6, wherein the device comprises at least first, second, and third cam follower fingers, and wherein the cam rotor includes at least a first cam element engageable only with the first cam follower finger, a pair of diametrically-opposed second cam elements engageable only with the second cam follower finger, and a plurality of third cam elements engageable only with the third cam follower finger.

9. (Original) The device of Claim 8, wherein the first cam element is an arcuate cam element subtending approximately 180 degrees of arc and located at a first radial distance from the center of the rotor, wherein each of the pair of second cam elements is an arcuate cam element subtending approximately 90 degrees of arc and is located at a second radial distance from the center of the rotor, wherein each of the plurality of third cam elements is an arcuate cam element subtending approximately 45 degrees of arc and is located at a third radial distance from the center of the rotor, and wherein the first radial distance is less than the third radial distance, and the second radial distance is between the first and third radial distances.

10. (Original) The device of Claim 9, wherein the plurality of third cam elements comprises four equidistantly-spaced third arcuate cam elements.

11. (Original) An infusion system for delivering selectable flow rates of a therapeutic liquid to a patient, comprising:

a pressurized fluid reservoir containing a volume of the liquid and having an outlet; and

a flow-regulating device having an inlet fluidly coupled to the outlet of the reservoir and an outlet coupled to an IV conduit;

wherein the flow-regulating device comprises:

a plurality of flow conduits fluidly connected between the inlet and the outlet, the flow conduits being of substantially equal inside diameters, each of the flow conduits having a length representative of a different pre-defined flow rate; and

a flow rate selection mechanism for selectively obstructing fluid flow through the flow conduits, thereby to provide a flow rate from the inlet to the outlet corresponding to the combined flow rates of the unobstructed flow conduits.

12. (Original) The infusion system of Claim 11, further comprising a fill valve fluidly coupled between the outlet of the reservoir and the inlet of the flow-regulating device.

13. (Original) The infusion system of Claim 11, wherein in the reservoir is pressurized by a pump applying a controllable pressure to the reservoir.

14. (Original) The infusion system of Claim 11, wherein the flow-regulating device comprises:

a plurality of flow conduits fluidly connecting the inlet and the outlet of the flow-regulating device, the conduits being of substantially equal internal diameter, each of the conduits having a particular length that determines a pre-defined flow rate of the liquid through the device; and

a flow rate selection mechanism that is actuable to selectively block liquid flow through (a) none of the flow conduits, and (b) one or more of the conduits.

15. (Original) The infusion system of Claim 14, wherein the flow rate selection mechanism comprises:

a flow-blocking element operatively associated with each of the flow conduits; and

an actuation mechanism that selectively actuates the flow blocking elements to block flow through the flow conduit associated with each actuated flow blocking element.

16. (Original) The infusion system of Claim 15, wherein each of the flow conduits includes a resiliently compressible occlusion tube, and wherein each of the flow blocking elements includes a resilient element that is movable by the actuation mechanism into a flow-blocking compression against its associated occlusion tube.

17. (Original) The infusion system of Claim 16, wherein the actuation mechanism comprises a plurality of cam elements, each of which is positioned operatively to move one of the resilient elements into a flow-blocking compression against its associated occlusion tube.

18. (Original) The infusion system of Claim 17, wherein each of the resilient elements comprises a resilient cam follower finger located so as to be operatively urged into a compressive engagement with one of the occlusion tubes when the cam follower finger is engaged by a cam element.

19. (Original) The infusion system of Claim 18, wherein the flow regulating device further comprises a housing containing the flow conduits and the cam follower fingers, the housing having one end including the device inlet and another end including the device outlet; and

wherein the actuation mechanism further comprises a cam rotor rotatably mounted in the housing and having the cam elements disposed thereon in positions in which each of the cam elements may operatively engage an associated cam follower finger as the cam rotor is rotated.

20. (Original) The infusion system of Claim 19, wherein the cam rotor is rotatable among a plurality of rotary positions, each of which is associated with a predefined fluid flow rate.

21. (Currently Amended) The infusion system of Claim [[18]] 19, wherein the device comprises at least first, second, and third cam follower fingers, and wherein the cam rotor includes at least a first cam element engageable only with the first cam follower finger, a pair of diametrically-opposed second cam elements engageable only with the second cam follower finger, and a plurality of third cam elements engageable only with the third cam follower finger.

22. (Original) The infusion system of Claim 21, wherein the first cam element is an arcuate cam element subtending approximately 180 degrees of arc and located at a first radial distance from the center of the rotor, wherein each of the pair of second cam elements is an arcuate cam element subtending approximately 90 degrees of arc and is located at a second radial distance from the center of the rotor, wherein each of the plurality of third cam elements is an arcuate cam element subtending approximately 45 degrees of arc and is located at a third radial distance from the center of the rotor, and wherein the first radial distance is less than the third radial distance, and the second radial distance is between the first and third radial distances.

23. (Original) The infusion system of Claim 22, wherein the plurality of third cam elements comprises four equidistantly-spaced third arcuate cam elements.

24. (Original) A device for regulating the flow of a liquid from a pressurized source, comprising:

a housing having an inlet and an outlet;

at least first, second, and third flow conduits in the housing fluidly connecting the inlet and the outlet, each of the flow conduits comprising a flow control tube and a resiliently compressive occlusion tube, wherein the flow control tubes are of substantially equal internal diameter, the first flow control tube having a first length associated with a first pre-defined flow rate, the second flow control tube having a second length associated with a second pre-defined flow rate, and the third flow control tube having a third length associated with a third pre-defined flow rate;

a resilient flow-blocking element operatively associated with each of the occlusion tubes and movable into a flow-blocking compression against its associated occlusion tube; and

an actuation mechanism in the housing that is operable (a) to selectively engage and move one or more of the flow-blocking elements into the flow-blocking compression against its associated occlusion tube, and (b) to selectively be disengaged from any of the flow-blocking elements.

25. (Original) The device of Claim 24, wherein the actuation mechanism is operatively engageable with each of the flow-blocking elements and is movable among a plurality of pre-defined positions in all but one of which it operatively engages one or more of the flow-blocking elements to block flow through the occlusion tube associated with each of the operatively-engaged flow-blocking elements, and in one position of which it operatively engages none of the flow-blocking elements.

26. (Original) The device of Claim 24, wherein the actuation mechanism comprises a plurality of cam elements, each of which is positioned operatively to move one of the resilient elements into a flow-blocking compression against its associated occlusion tube.

27. (Original) The device of Claim 26, wherein each of the resilient elements comprises a resilient cam follower finger located so as to be operatively urged into a compressive engagement with one of the occlusion tubes when the cam follower finger is engaged by a cam element.

28. (Original) The device of Claim 27, further comprising:

a cam rotor rotatably mounted in the housing and having the cam elements disposed thereon in positions in which each of the cam elements may operatively engage an associated cam follower finger as the cam rotor is rotated.

29. (Original) The device of Claim 28, wherein the cam rotor is rotatable among a plurality of rotary positions, each of which is associated with a predefined fluid flow rate.

30. (Currently Amended) The device of Claim [[27]] 28, wherein the device comprises at least first, second, and third cam follower fingers, and wherein the cam rotor includes at least a first

cam element engageable only with the first cam follower finger, a pair of diametrically-opposed second cam elements engageable only with the second cam follower finger, and a plurality of third cam elements engageable only with the third cam follower finger.

31. (Original) The device of Claim 30, wherein the first cam element is an arcuate cam element subtending approximately 180 degrees of arc and located at a first radial distance from the center of the rotor, wherein each of the pair of second cam elements is an arcuate cam element subtending approximately 90 degrees of arc and is located at a second radial distance from the center of the rotor, wherein each of the plurality of third cam elements is an arcuate cam element subtending approximately 45 degrees of arc and is located at a third radial distance from the center of the rotor, and wherein the first radial distance is less than the third radial distance, and the second radial distance is between the first and third radial distances.

32. (Original) The device of Claim 31, wherein the plurality of third cam elements comprises four equidistantly-spaced third arcuate cam elements.

33. (New) A device for selectively regulating the flow rate of a fluid, comprising:

a housing including an inlet and an outlet;

a plurality of flow conduits fluidly connected between the inlet and the outlet, the flow conduits being of substantially equal inside diameters, each of the flow conduits having a length representative of a different pre-defined flow rate; and

a flow rate selection mechanism, operatively mounted in the housing, for selectively obstructing fluid flow through the flow conduits, thereby to provide a flow rate from the inlet to the outlet corresponding to the combined flow rates of the unobstructed flow conduits, wherein the flow rate selection mechanism comprises:

a flow-blocking element operatively associated with each of the flow conduits, each flow-blocking element being selectively operable to block fluid flow through its associated conduit; and

a cam rotor disc rotatably mounted in the housing and having a lower surface provided with a plurality of cam elements in radial positions in which each of the cam elements is operatively engageable with an associated one of the flow-blocking elements as the rotor is

rotated through a plurality of pre-defined rotational positions, each of the rotational positions being associated with a pre-defined fluid flow rate, wherein in all but one of the rotational positions the cam elements operatively engage one or more of the flow-blocking elements to block flow through the flow conduit associated with each of the operatively-engaged flow-blocking elements, and wherein in one pre-defined rotational position the cam elements operatively engage none of the flow-blocking elements.

34. (New) The device of Claim 33, wherein each of the flow conduits includes a resiliently compressible occlusion tube, and wherein each of the flow-blocking elements comprises a resilient element that is movable into and out of a flow-blocking compression against its associated occlusion tube.

35. (New) The device of claim 33, wherein the housing includes a detent member, and wherein the cam rotor disc has a peripheral edge with a plurality of detent grooves defining the respective rotational positions when engaged by the detent member.

36. (New) The device of claim 34, wherein each of the cam elements is positioned on the lower cam rotor disc surface so as to move one of the resilient elements in a flow-blocking compression against its associated occlusion tube.

37. (New) The device of Claim 34, wherein each of the resilient elements comprises a resilient cam follower finger located so as to be operatively urged into a compressive engagement with one of the occlusion tubes when the cam follower finger is engaged by a cam element.

38. (New) A device for regulating the flow of a liquid from a pressurized source, comprising:

a housing having an inlet and an outlet;

at least first, second, and third flow conduits in the housing fluidly connecting the inlet and the outlet, each of the flow conduits comprising a flow control tube and a resiliently compressive occlusion tube, wherein the flow control tubes are of substantially equal internal diameter, the first flow control tube having a first length associated with a first pre-defined flow

rate, the second flow control tube having a second length associated with a second pre-defined flow rate, and the third flow control tube having a third length associated with a third pre-defined flow rate;

a resilient flow-blocking element operatively associated with each of the occlusion tubes and movable into a flow-blocking compression against its associated occlusion tube; and

an actuation mechanism in the housing that is operable (a) to selectively engage and move one or more of the flow-blocking elements into the flow-blocking compression against its associated occlusion tube, and (b) to selectively be disengaged from any of the flow-blocking elements, wherein the actuation mechanism comprises a cam rotor disc rotatably mounted in the housing and having a lower surface provided with a plurality of cam elements in radial positions in which each of the cam elements is operatively engageable with an associated one of the flow-blocking elements as the rotor is rotated through a plurality of pre-defined rotational positions, each of the rotational positions being associated with a pre-defined fluid flow rate, wherein in all but one of the rotational positions the cam elements operatively engage one or more of the flow-blocking elements to block flow through the occlusion tube associated with each of the operatively-engaged flow-blocking elements, and wherein in one pre-defined rotational position the cam elements operatively engage none of the flow-blocking elements.

39. (New) The device of Claim 38, wherein each of the resilient elements comprises a resilient cam follower finger located so as to be operatively urged into a compressive engagement with one of the occlusion tubes when the cam follower finger is engaged by a cam element.

40. (New) The device of claim 38, wherein the housing includes a detent member, and wherein the cam rotor disc has a peripheral edge with a plurality of detent grooves defining the respective rotational positions when engaged by the detent member.